361 Most of the dwellings in Bang Chan flanked the canals that stretched away from the temple area. All houses were in sight of one or more other houses, if not standing side by side. Here and there they formed small hamlets where kinsmen tended 351 to live in proximity. Around the houses were kitchen gardens and threshing floors, and behind them, the fields. Bananas grew 245 abundantly; pineapples, mangoes, and other fruits occasionally. The canals were full of water-vegetables, cultivated or wild, 241 while fish were plentiful. Water sources were the rain, kept 226 in large jars; artificial ponds dug near the houses and fed from ground water; and the canals. No wells existed. The large 312 tile roofs of the temple collected a good deal of rain-water which was available to anyone during the hot season when all water ran low.

General Nutritional Level

146 The population was physically well-formed with few physical [142] deformities evident. There was little obesity or emaciation. The daily diet (cf. Hauck, et al.:passim) consisted of large quantities of rice, with small amounts of fish, meat, vegetables, fruits, spices, and eggs. Food at the not-infrequent festivals [292] was rich in meat, eggs, and sugar. No milk was available except canned imports, and little was used. "Nevertheless, though caloric deficiency ('hollow hunger') was not prominent, over half of a sample of the population inspected medically had one or more signs of malnutrition. Even in a group chosen for research reasons for apparently good nutrition, about one in four had some such sign and in another group, selected for evidence of poor nutrition, two out of three persons had such."[2] The nutritional level in Bang Chan did not always correlate absolutely with economic level, for nutritionally one of the poorest families was found to be one of the best fed because the father did so much fishing and collecting of green canal vegetables. The [178] change-over, some decades ago, from home pounding of rice to [256] steam milling by most families had probably been a major factor in increasing nutritional deficiencies throughout the community.

2. Dr. H.M. Hauck, personal communication, 1959.

244 Vegetables and Fruit. - Although kitchen-gardening has been encouraged by the Thai government, vegetables and fruit were grown in Bang Chan to a limited extent only. Every family had some sort of kitchen garden, but many edible plants which can be grown in the village were grown by relatively few families. The list of fruits grown in Bang Chan in 1948-49 (Sharp et al., 1953) included four times as many items as were grown by one or more of the 11 families that participated in the dietary study. The list of vegetables and spice plants grown or gathered by these families included 27 items, as compared to 41 listed by Sharp et al. Spices and chili were more commonly grown than vegetables and fruit.[1]

244 One affluent household whose food expenditures for 1949 were reported by Sharp et al., (1953, pp. 214-215) produced for home use, 125 kg. of palm sugar valued at 200 baht and 500 coconuts, valued at 450 baht. Home production of both of these was unusual. Few families in Bang Chan grew either sugar palms or coconut palms and expenditures for coconuts and palm sugar were usual. During the major flood of 1942, villagers noted that coconut palms survived whereas all other fruit trees were destroyed. After this, a number of farmers planted coconut palms, but they had not yet begun to produce.

361 In 1954, about 120 acres (300 rai) of the total of about 2800 acres (7000 rai) of land in the village were used for home sites and home gardens for 336 households. Individual home sites usually varied in area from about one-quarter to one acre, and were occupied by buildings, threshing floor and space for poultry as well as trees and garden space. Portions of this might be under water for several months of the year. Increased home production of fruit and vegetables would in many cases necessitate increasing the size of the home site by purchase, mounding or both. Ordinarily, increased land for the kitchen garden was obtained at the expense of some of the

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1. In a typical farm garden in Bang Chan one would find bananas growing, and a number of plants used for seasoning curry. Various kinds of chilies, lemongrass, bergamot, of which both rind and leaves are used, and galangal were grown by all families who participated in the dietary study. Both sweet and holy basil were commonly grown. Many families grew one or more varieties of gourds and of eggplant, some of which can be trained to grow on a tree or trellis. The inflorescence of the banana was also used as a vegetable. Leafy vegetables were not commonly cultivated but some families grew (2)phag (2)ka-(2)cheed, a green water plant, in gardens staked out at the edge of the canal, or in a pool, and some had trees, the leaves of which were edible. Swamp cabbage or (2)phag (3)bung grew wild along the edge of the canals and was the most commonly used green leafy vegetable. A few families grew guava, jujube, star gooseberry, Manila tamarind, mango and pineapple.

132 The normal distribution of rain in the region, how-
*243 ever, is almost ideal for single crop rice production. Heavy rainfall in May and June softens the soil for easy plowing and harrowing. During July and August, when the young plant does not require much water, the rainfall moderates. Again there is heavy rainfall in September and October when the maturing plant needs rising water as it shoots upward. Finally, during the harvesting season of December and January there is a minimum of rainfall. It is in terms of rainfall that the people divide the year into three seasons: (1) the rainy season of late May to November; (2) the cold season, December into early February; and (3) the dry hot season from late February to early May.

Vegetation

*243 Of the 6,404 rai privately owned in Bangchan 6,106
137 rai is devoted to rice and 298 rai to homelots. During the
[311] rice season the village is seen as a vast rice field inter-
• [351] spersed with bamboos and fruit trees on the homelots which
[361] string along the half dozen canals of the village. In the
[312] dry season only stumps of rice stalks are left in the field.
192 Some of these may be removed by burning. With the coming
231 of rains, which usually fall once or twice in March and four or five times in April, a variety of grasses begin to appear and the rice field is gradually transformed into a grass field, providing a pasture for the buffaloes until the next planting season when the size of the grass field available

#243
132
137 to the buffaloes will be gradually reduced by the process
231 of land preparation.

The homelot is usually surrounded on all sides,
244
245 except the one facing the canal, with bamboos which serve
• 351 to protect the farm home from strong wind. Within this compound there always is a kitchen garden where a variety of plants and vegetables for everyday use are grown. If the homelot is large, there may be enough room at the backyard for an orchard where fruit trees may be grown. In some cases, aquatic plants are cultivated in the canal in front of the house.

137 In addition to cultivated plants, there are to be seen also wild shrubs and vines which are more or less restricted to small strips of land along the banks of the canals. Wild aquatic vegetables, especially the morning glory, are always seen in these canals, making them appear narrower than they actually are.

Livestock

231 Buffaloes: As in most of the rice producing areas of the country, so in Bangchan buffaloes are used in all kinds of farm work where the help of draft animals is needed. Since the village is without land which can be grazed the year-round, buffaloes are not locally bred but are brought in from the northeast and other parts of the kingdom. To be sure, there are some local-born buffaloes, and these are considered to be stronger and to live longer than the imported

*243 growing village could not very well be studied in a brief period of only one rice year. Rather, the field study should be extended to cover years of good as well as poor crop.

Land Utilization

Official records show that the area of land privately owned in the seven hamlets comprising Bangchan is 6,404 rai. [503] ..hen an estimated area of 100 rai of public land occupied by the half dozen canals is added to the private land area, the total area of the village may be figured at about 6,500 rai.

*243 • 351 423 311 621 The area of each of the 298 homelots in Bangchan varied. It is rather difficult to get accurate figures for these homelot areas. We may, however, give an allowance of one rai for each homelot on the basis of crude estimate. This would include space for buildings and all of the home compound including family pools as well as kitchen garden, and in some cases area devoted to fruit trees. Since all of the land area in Bangchan other than homelots is devoted to rice growing, we may estimate the land available for rice production by simply deducting the homelot area from the total area of land privately owned in the village. This was found to be 6,106 rai in 1953 (Table 12).

*243 311 423 621 It should be noted that not all of this area of 6,106 rai was tilled by Bangchan residents, and that some of the villagers also worked on rice fields outside our arbitrary

[TEXT CONTINUED ON PAGE 113]

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 12

LAND AVAILABLE FOR RICE PRODUCTION
Bangchan, Thailand, 1953

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Hamlet	Land Privately Owned	Allowance for Homelot	Land Available for Rice Production
	rai	rai	rai
BC4	930	40	890
BC5	809	28	781
BC6	900	47	853
KY5	891	63	828
KY6	916	31	885
KY7	939	42	897
KY8	1,019	47	972
Total	6,404	298	6,106

243 buffaloes heretofore undreamt of and will have to bear
231 the consequent burden of increased cost of producing rice.
311

Some description of the homelots which constitute
311 almost five per cent of the land area of Bangchan has already
351 been given in the section on vegetation, Chapter II. From
[231] the standpoint of land utilization, functions of the homelot
[235] other than providing standing room for the living quarters
[244] may be mentioned as follows:
[245]
[226]

1. It provides space for threshing and for storage of rice and farm equipment including buffaloes.
2. It provides room for chicken or duck raising.
3. It provides land for a kitchen garden, and for fruit and vegetable growing.
4. It provides space for fish trapping by the draining method.

To serve these functions, homelots in any rice growing village, where the fields are submerged under water during the entire life of the rice plant, must be high above water level during the flood season, must be well drained, and must have pools with ample shade.

243 Rice land in its natural state does not meet these
311 requirements for a homelot. In the first place its level is too low. Second, the impervious layer of clay characteristic of rice land does not permit soil drainage. To make a homelot out of rice land, it is necessary that the prospective site be mounded up to a level two or three feet higher than the level of the surrounding fields. The hole from which

243 earth has been removed for the purpose of raising the yard
911 becomes a fish pool simply by the construction of a ditch connecting the hole with the canal, thus partially giving the last mentioned requisite of a homelot. Again, in the
312
• 951 process of mounding up the homelot the soil may be made well drained by skillful handling of the earth. The technique adopted by the Chinese experts in the famous truck gardening area of Damnernsaduag is to remove the top soil first from the strip intended to be the ridge of the prospective vegetable garden. Then the top soil of the adjacent area intended to be the pool is also removed, and these top soils from the two adjacent strips of land are put together in one pile. Next, the tough subsoil of the pool strip is dug up and placed over the bare subsoil of the ridge strip. Finally, the subsoil ridge thus elevated is covered with the topsoils from the mixed pile. By this manipulation the depth of the top soil of the newly created ridge is greatly increased from the original depth of about 8-10 inches to perhaps 16-20 inches. The presence of the pool, also newly created, along the ridges further enhances the draining quality of the strip. Unfortunately, this technique was unknown in Bangchan, and mounding of the homelot was done by simply dumping the earth dug out from the strip intended to be the pool all over the land area of the prospective homelot. With the presence of the pool which served as a receptacle for water and with constant hoeing of the garden area, the soil depth also was increased and the draining quality improved.

*243 requires much additional hand labor and reduces the possibil-
242 ities for mechanization to a minimum. On the other hand, the more labor intensive transplanting method would seem to be more suitable to a population pressure area like Thailand if it really gives as relatively higher a yield as it is claimed to give.

*243 Farm equipment

• 351 [235] [244] [245] [226] In Thai agriculture, it is very difficult to separate the farm from the home. In the chapter on the community it has already been indicated that the home lot not only is the living place for the farm family but also provides space for threshing and for storage of farm equipment, room for chicken raising, land for kitchen garden and for fruit and vegetable growing, and space for fish trapping by the draining method.

*243 351 422 In other words, all the material components of the farm, except the rice fields, are located or stored on the home lot. Here, items that are uniformly or frequently found include:

A. Household equipment

1. Buildings
2. Furniture
3. Bedding facilities
4. Kitchen accessories
5. Storing facilities
6. Lamps of various sizes
7. Ritual accessories

B. Farm equipment

1. Farm building: equipment and buffalo shed.
2. Implement: plow, harrow, yoke, roller, shovel, spade, hoe, weeding knife, noria, sickle, pitch-fork, rake, broom, winnowing machine, wooden winnowing spitula, basket, mat bin, box bin, home-mill.

*243
• 351
422

3. Mechanical power: windmill.
4. Engine power: internal combustion engine.
5. Fishing equipment: pressure lamp, spear, hook, throwing net, dipping net, trap.
6. Repair equipment: axe, knife, chisel, handsaw, auger set, hammer, jack plain, block plain.
7. Transportation facilities: various kinds of boats.

C. Livestock

1. Draft animals: buffaloes.
2. Poultry: chicken, duck.

D. Seeds and materials

1. Paddy for seeds and for consumption.
2. Ropes.
3. Fuel and oil for engine and for light.

*243
*128 Since we are primarily concerned in this section with farm equipment, only those listed under B will be discussed. And since we are dealing primarily with rice production which is the main source of income of Bangchan rice farmers, attention will be paid almost exclusively on the equipment which are used in the production of rice.

For the purpose of our discussion, farm equipment used in Bangchan may be categorized in a number of ways: (1) According to their use in the various processes of rice production; (2) According to their relative degree of indispensibility on rice farms; (3) According to their relative prices, and the cose of maintenance and repair; and (4) According to their historical improvement.

*243 Farm equipment was used in Bangchan in different processes of rice production as follow: